

Application No. 10/038,223
Docket No. 17MY-7138
Amendment dated November 20, 2003
Reply to Office Action of August 20, 2003

REMARKS

In the Office Action, the Examiner reviewed claims 1-9, 19 and 20 of the above-identified US Patent Application (claims 10-18 were withdrawn as a result of a restriction requirement in a previous office action), with the result that the specification was objected to, claim 1 and its dependent claims 2-7, 19 and 20 were rejected under 35 USC §103, and claim 8 and its dependent claim 9 were allowed. In response, Applicant has amended the specification and claims as set forth above. More particularly:

The specification has been amended at paragraph [0025] to address the objection to the specification, and now correctly states that all of the alloys in Table 3 have carbon contents and Nb/C ratios within the published limits for the commercial Custom 450 alloy, instead of within the ranges disclosed for the Custom 450 alloy in U.S. Patent No. 3,574,601.

To assist in distinguishing the ranges disclosed in U.S. Patent No. 3,574,601 and those published for the commercial Custom 450 alloy, paragraph [0025] has been further amended to state that alloy C1 has a composition within the limits published for the Custom 450 alloy (e.g., Nb/C ratio: 8xC minimum), but its Nb/C ratio exceeds that set for the Custom 450 alloy in U.S. Patent No. 3,574,601 (Nb/C ratio: 10xC maximum). Finally, this paragraph was amended to clarify which ranges of alloys C1 (Custom 450), C5 and C6 were outside the ranges specified for Applicant's alloy.

Independent claim 1 has been amended to restore certain limitations originally

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recited in a "wherein" clause that was deleted by Applicant's amendment filed June 25, 2003, but with a minimum Charpy impact toughness of 70 J instead of greater than 55 J. In view of the amendment to their parent claim 1, dependent claim 2 has also been restored to its original scope and claim 20 has been amended to specify an ultimate tensile strength of at least 1275 MPa, which finds support in Applicant's Table 2.

Finally, claims 10-18 have been canceled in view of the restriction requirement.

Applicant believes that the above amendments do not present new matter. Favorable reconsideration and allowance of remaining claims 1-9, 19, and 20 are respectfully requested in view of the above amendments and the following remarks.

Objection to the Specification

The Examiner objected to the disclosure for stating at paragraph [0025] that alloys C1, C5 and C6 were within the ranges disclosed in U.S. Patent No. 3,574,601. In response, and as discussed above, Applicant has amended the specification to clarify that alloys C1, C5 and C6 were within the published limits for the commercial Custom 450 alloy (and outside the ranges disclosed in U.S. Patent No. 3,574,601). As such, Applicant respectfully requests withdrawal of the objection.

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Rejection under 35 USC §103

Independent claim 1 and its dependent claims 2-7, 19 and 20 were rejected under 35 USC §103(a) as being unpatentable over a Carpenter Custom 450 publication, a publication by Henthorne et al. (Henthorne), and a publication by Bridge et al. (Bridge), all of which pertain to and discuss the alloy disclosed in U.S. Patent No. 3,574,601 to Myers et al. Applicant respectfully traverses this rejection in view of the claims as amended and the following comments.

As an initial matter, the Examiner noted that the Cb (Nb) column in Table 1 of Henthorne was not shown due to the poor copy quality of Henthorne. A better copy of Henthorne is not readily available, and in any case Applicant presumes that the Cb contents of the alloys listed in Table 1 of Henthorne are within the range set forth in the Custom 450 publication, namely, at least 8xC (and therefore overlapping Applicant's claimed Cb range of 10xC to 15xC). Applicant believes this presumption is reasonable, in that the mechanical properties listed in Table 2 of Henthorne appear to be based on the same very alloys that were evaluated to obtain the mechanical properties identified as being typical for the Custom 450 alloy in the Custom 450 publication.

In the Office Action, independent claim 8 was deemed to recite allowable subject matter because

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The art of record does not teach or fairly suggest a steam turbine component formed of a precipitation-hardened stainless steel alloy composition, as claimed, having an ultimate tensile strength of at least 1275 MPa together with a Charpy impact toughness of at least 80 Joules, and has been tempered at a temperature of about 480 to 500C.

As noted above, Applicant has amended independent claim 1 to require:

the alloy has been tempered at a temperature of about 480°C to about 525°C to have an ultimate tensile strength of at least 1200 MPa and a Charpy impact toughness of at least 70 J.

Applicant's claim 2 further requires the alloy of claim 1 to have a Charpy impact toughness of at least 80 J, and claim 20 further requires the alloy of claim 1 to have an ultimate tensile strength of at least 1275 MPa.

The Examiner cited the Custom 450 publication as disclosing an alloy whose alloying ranges overlap those recited in claim 1, and noted that the publication disclosed that the Custom 450 alloy can possess a tensile strength greater than 1200 MPa.

However, the Custom 450 publication does not disclose that the alloy can simultaneously have a Charpy impact toughness of greater than 70 J (about 52 ft-lbs).

The Henthorne publication also fails to disclose that the Custom 450 alloy can simultaneously have a tensile strength of greater than 1200 MPa (about 175 MPa) and a Charpy impact toughness of greater than 70 J (about 52 ft-lbs). In addition, neither the Custom 450 publication nor Henthorne discloses the Custom 450 alloy as

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simultaneously having an ultimate tensile strength of greater than 1200 MPa and a Charpy impact toughness of at least 80 J (claim 2), or as simultaneously having an ultimate tensile strength of at least 1275 MPa and a Charpy impact toughness of at least 70 J (claim 20). According to Applicant's teachings, this combination of strength and toughness is achieved by carefully balancing the composition (e.g., Nb/C ratio, nitrogen content, etc.) and tempering of Applicant's alloy (see paragraph [0009] of Applicant's specification).

Finally, Bridge was cited for disclosing "a 450 steel alloy composition that meets the claimed composition except for a slightly higher amount of Nb (Cb)." However, the cited alloy (Table 1 on page 280 of Bridge) contains 0.16 wt.% cobalt and 0.029 wt.% phosphorus, the former of which is outside the scope of Applicant's claimed alloy in view of the "consisting of" transition phrase, while the latter is above the maximum level of phosphorus ("not greater than 0.020 percent") permitted in Applicant's claimed alloy. Therefore, Applicant believes that Bridge cannot be said to supplement the teachings of the Custom 450 publication and Henthorne in order to arrive at Applicant's invention.

For the reasons above, Applicant respectfully requests withdrawal of the rejection to claims 1-7, 19 and 20 under 35 USC §103(a).


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Closing

In view of the above, Applicant believes that all issues outstanding from the Office Action have been addressed, and that the claims define patentable novelty over all the references, alone or in combination, of record. It is therefore respectfully requested that this patent application be given favorable reconsideration.

Should the Examiner have any questions with respect to any matter now of record, Applicant's representative may be reached at (219) 462-4999.

Respectfully submitted,

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